

Claims

- [c1] 1. A metal machining apparatus for removal of metal from a workpiece, comprising:
- 1) a holder for a workpiece,
 - 2) a metalworking tool that is configured to engage the workpiece along a machining interface to remove metal from the workpiece
 - 3) a coolant nozzle for emitting a stream of a cooling fluid, the nozzle comprising a nozzle body having a flow passage and a laser bore, wherein the flow passage has an inlet and an outlet, and the laser bore has a line of sight with the flow passage outlet, and
 - 4) a visible laser removably inserted into the laser bore, which cooperates with the nozzle body for visually positioning the nozzle relative to the metalworking tool, whereby the emitted stream of cooling fluid can be directed at the machining interface.
- [c2] 2. The metal machining apparatus according to Claim 1 wherein the machining interface comprises a machining reference point, and the flow passage outlet has a stream reference point, whereby the coolant nozzle can be positioned by aligning a visible laser beam that is

emitted from the laser along a line passing through the stream reference point and the machining reference point.

- [c3] 3. The metal machining apparatus according to Claim 1 wherein coolant nozzle is configured for removal of the visual laser, and for insertion of a removable plug into the laser aperture.
- [c4] 4. The metal machining apparatus according to Claim 3 wherein the removable plug has a distal end having a surface, wherein the surface mimics the shape of the inner surface of the flow passage that had been removed when the laser bore was formed in the nozzle body.
- [c5] 5. A metal grinding apparatus for removal of metal from a workpiece, comprising:
- 1) a holder for a workpiece,
 - 2) a rotating grinding tool that is configured to engage the workpiece at a machining interface to remove metal from the workpiece, wherein the machining interface has an interface profile,
 - 3) a coolant nozzle for emitting a stream of a cooling fluid, wherein the stream has a cross-sectional profile substantially the same as the interface profile, and
 - 4) a visible laser cooperating with the coolant nozzle, for visually positioning the nozzle relative to the metalwork-

ing tool, whereby the stream of cooling fluid can be directed at the machining interface, and wherein the cross-sectional profile of the stream registers with the interface profile of the machining interface.

- [c6] 6. A laser-targeted coolant nozzle for use in applying coolant fluid to a machining apparatus for removal of metal from a workpiece at a machining interface, comprising:
- 1) a coolant nozzle body having a flow passage and a laser bore, wherein the flow passage has an inlet and an outlet, and the laser bore forms an access opening in the outer surface of the nozzle body and has a line of sight with the flow passage outlet, and
 - 2) a visible laser removably insertable into the laser bore, which cooperates with the nozzle body for visually positioning the coolant nozzle relative to the machining apparatus, whereby the stream of cooling fluid can be directed at the machining interface.
- [c7] 7. The laser-targeted coolant nozzle according to Claim 6 wherein the laser bore is in fluid communication with the flow passage.
- [c8] 8. The laser-targeted coolant nozzle according to Claim 6 wherein the coolant nozzle is further provided with a removable plug that can be inserted into the laser bore

in place of the laser, to seal the access opening from fluid communication with the flow passage.

- [c9] 9. The use of a visible laser for targeting the orientation of a coolant nozzle, thereby directing a stream of coolant fluid at a machining interface of a machining tool with a workpiece during the removal of metal from a workpiece by the machining tool.